



**PASSION FOR
HYGIENE PROTECTION**

Finishing solutions for
high-performance protective
fabric and non-woven textiles





/ How do we
bring **best-in-**
class expertise,
sustainability
and performance
to **hygiene**
protection?

CREATING SUSTAINABLE SOLUTIONS

At Archroma, we continuously challenge the status quo in the deep belief that we can make our industry sustainable.

Archroma is committed to developing innovative products and processes that are safer for the consumer and for the environment. We strongly believe, based on our extensive experience in textile processing, that sustainability can generate innovation, performance and often lead to cost reductions and added value for our customers. For this reason, our clear ambition is to offer our customers the best possible system for their textile segments.

Innovation is a core competence of Archroma, which ensures that our products and services meet future demands, foster future technologies and contribute to a more sustainable textile industry.

As a global leader in color and specialty chemicals with a trusted heritage, we offer bespoke product solution systems and innovations. We strive to be a reliable partner for textile mills as well as major retailers and brands for the whole textile chain – **from the first idea to the final article.**

Brand owners and retailers around the world are taking action to evaluate the environmental impact of textile treatment, dyeing and finishing processes in response to consumer concerns. We can support textile manufacturers with this. Our exclusive ONE WAY Process Simulator can be used to simulate and compare products and processes, and thus calculate the ecological and economical profile of the final end-product.

/ ABOUT US

Archroma is a **global color and specialty chemicals** company committed to innovation, world-class quality standards, high service levels, cost-efficiency and sustainability.

At Archroma, **we share your passion for hygiene protection**, and we bring our expertise, innovation power and our commitment to sustainability into developing cutting-edge technologies and products to support your needs.



Archroma has specialized Competence Centers bringing to our customers:

- A hub of knowledge, R&D, expertise, technology and creativity support;
- A wide range of testing and consulting services in the **synthetics & wool, cellulose, printing, denim & finishing segments**;
- A complete system offering, thanks to our unique combination of expertise in spinning, pretreatment, coloration, as well as finishing;
- Access to global and regional knowledge and expert network for seamless support in global supply chain management;
- Powerful training centers for our affiliates, partners and customers.

At Archroma, we continuously challenge the status quo in the deep belief that we can make our industry sustainable.

The majority of Archroma's products are certified by some of the most important eco-standards, such as:

• bluesign® • Oeko-Tex® • GOTS • ZDHC • REACH • EU Ecolabel • C2C • RSL • MRSL

/ PROTECTION AND HYGIENE FOR YOUR TEXTILE PRODUCTS

Personal protective textiles needed, specially nowadays, in healthcare or hospitals must fulfil many performance requirements, where one of the most important properties is the resistance against fluids. Creating a barrier against fluids is needed to avoid skin contact with infective contaminants, as blood has a lower surface tension than water (42mN/m compared to 72mN/m), which means it can more easily penetrate through textile materials.

Because of this lower surface tension of blood, the surface tension of the fabric becomes more important than the classic repellence needed in outdoor gear for example, where usually only a protection against rain is needed. For highest protection levels an additional polymer film is necessary to provide a reliable pressure resistant barrier, which can be achieved either by coating or lamination.

It is critical to keep in mind that, for all medical protective clothing, the supplier of the final product is generally responsible for all regulatory compliance requirements, including proof of efficacy, etc.

Protective clothing

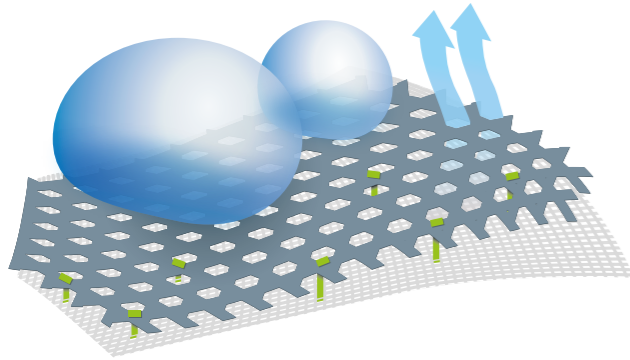
- Protective clothing refers to the clothing worn by personnel in special areas such as medical emergency rooms, where infectious disease can be found.
- There is a wide field of different protective clothing types with different functionalities and therefore different requirements.
- Disposable solutions are dominating the market.
- Non-disposables can have the same performance but are more environmentally friendly.
- The main requirements are: different barrier functions against liquid penetration and blood repellence.
- According to the zone and end use, different performance levels are required as well.
- It is crucial to understand which treatment is required and which standard has to be met.



/ REPELLENT BARRIER

Droplets emitted by humans when sneezing or coughing are water-based and hydrophilic micro-sized drops with a maximum 100-micron diameter. Coming from human saliva, they contain many different body-based particles and can also carry bacteria and viruses.

A repellent treatment of the textile helps to create a barrier effect on the surface and to allow less droplets sticking to the outer layer of the mask by minimizing contact between a potentially infectious agent and the fabric.



Protection with Nuva® N (C6 technology, PFOA-free*)

- Hydrophobic barrier against water, saliva and blood
- Oleophobic barrier against body fats

Protection with Smartrepel® Hydro (PFC-free* technology)

- Hydrophobic barrier against water

When comparing the existing barrier technologies, that are widely accepted in apparel and technical textiles, polyfluorinated chemicals (PFC) provide superior functionalities as they protect against water but also fat or oil-based liquids, but also as their ability to reduce the surface energy of textile materials is much higher. This high efficacy prevents droplets from adhering and allow them to easily roll off the article surface, thus avoiding contact with the skin surface.

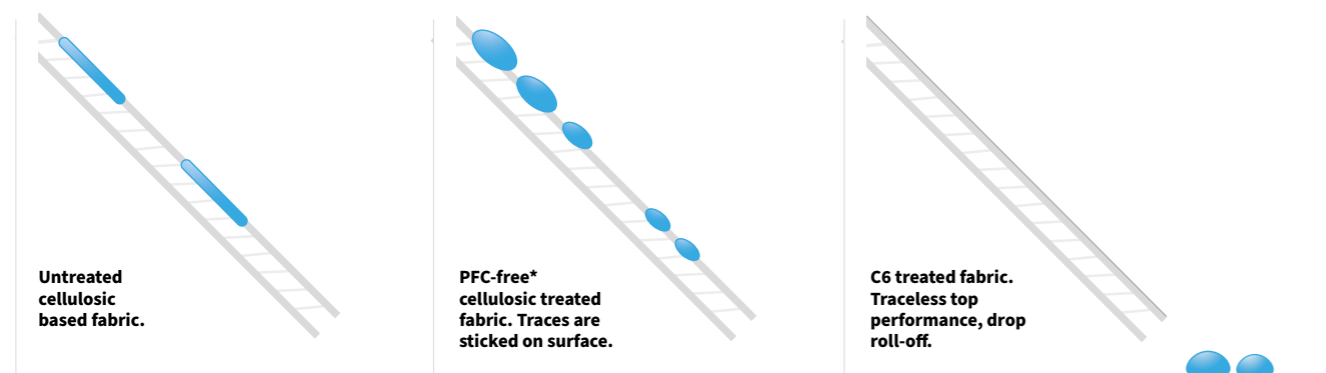
In difference to fluorocarbon chemistry, fluorine-free* repellent technologies provide a barrier effect only against water-based substances.

This means that droplets that are not only containing water may not roll off that easily and may even adhere on a textile.

Barrier effects against liquids, different levels of protection

Roll-off properties increase as the surface tension of the treated fabric lowers. C6 treated fabric has a surface tension below 19mN/m, whereas any PFC-free* treatment achieves maximum 30mN/m.

Human saliva (10% solution) performance



Based on internal tests

*Below limits of detection according to industry standard test methods.

/ ANTIMICROBIAL HYGIENE PROTECTION

An antimicrobial treatment provides additional protection, better hygiene and reduced odor, as any adhered bacteria are deactivated and unable to grow. In medical hygiene this is very important as methicillin-resistant staphylococcus aureus (MRSA) is a common threat nowadays and adds a risk to any virus-infected person who is hospitalized.

SANITIZED AG, our partner for hygiene technologies, aids measures to promote hygiene management.

Sanitized® T99-19 and Sanitized® T11-15 textile products were tested against viruses (in accordance with ISO 18184:2019) and show a reduction of viral load by up to 99% on treated PES textiles.

Tests were conducted using a feline coronavirus possessing structures and mechanisms reminiscent of SARS-CoV-2, thus facilitating inferences about COVID-19. For Sanitized T99-19 also test with Human Corona virus SARS-CoV-2 virus were conducted.

A positive viral load reduction on a treated article has to be tested according to national legislation requirements.

Viral activity

- Viral activity efficiency after 2hrs according ISO 18184 against feline coronavirus;
- The feline coronavirus belongs to the same family as SARS-CoV-2;
- As the virus activity declines on each surface it is important that a protection treatment speeds this up to reduce cross-infection;
- Sanitized® T99-19 and T11-15 showing high efficiency;
- Both products are not particle-based;
- Antimicrobial treatments are more and more used in other items, such as fashion and active wear.

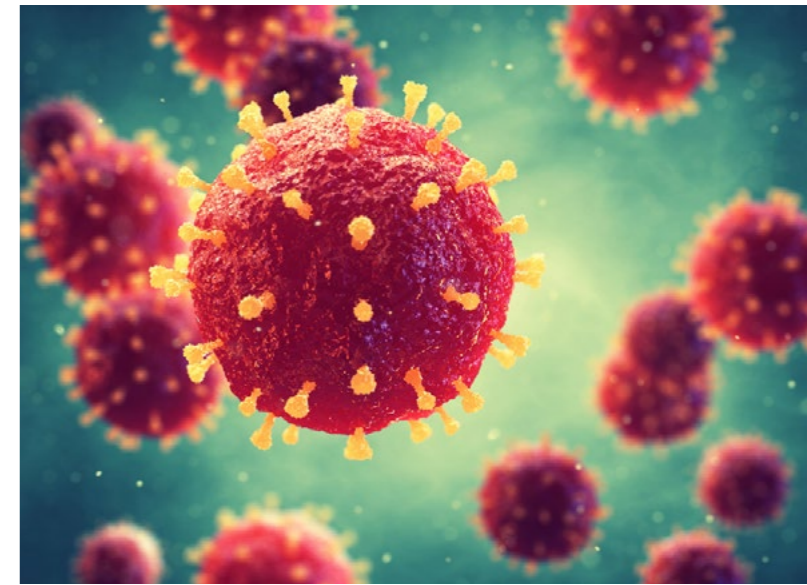
Difference between bacteria and viruses

Quick Check

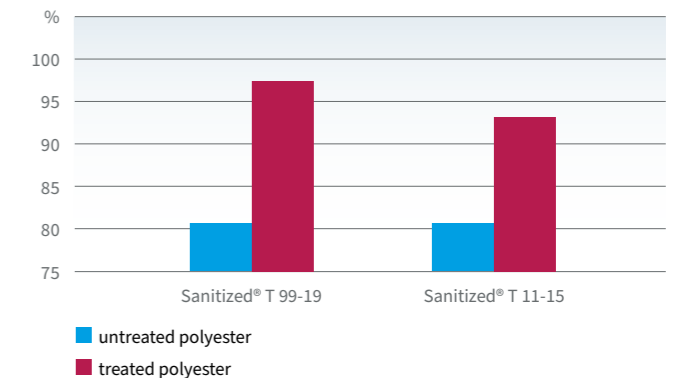
- Are really tiny
- Can make you sick quickly
- Multiply without other cells
- Antibiotics are effective
- Are living things

Bacteria Virus

	Bacteria	Virus
• Are really tiny	✓	✓
• Can make you sick quickly	✓	✓
• Multiply without other cells	✓	✗
• Antibiotics are effective	✓	✗
• Are living things	✓	?

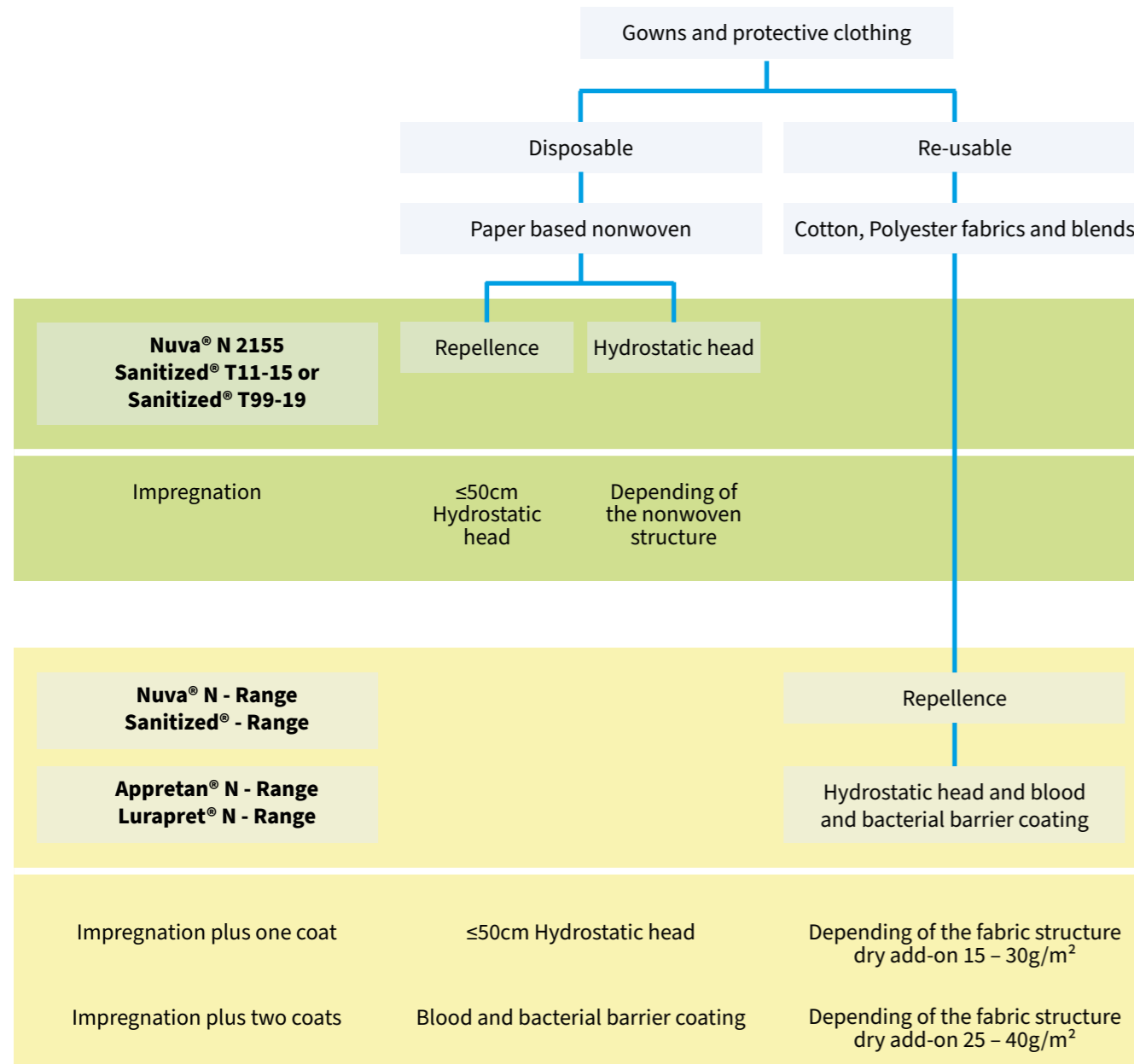


Viral load reduction

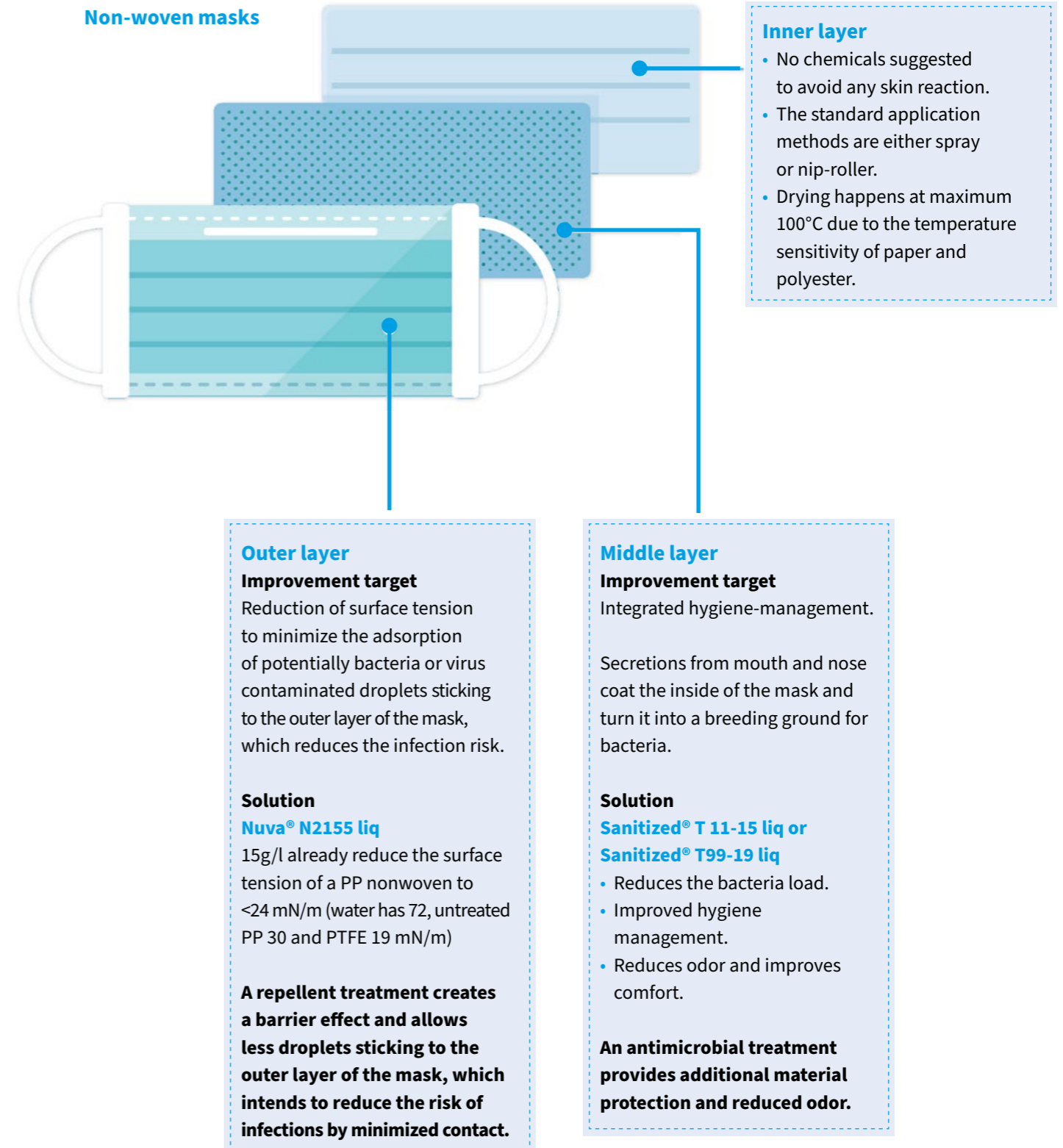


/ BEST-IN-CLASS PROTECTION

Ideally, medical textiles and clothing should be treated with additives proving some barrier effect, anti-bacterial and viral reduction on the textile.



Archroma has you covered with potentially life-saving chemistry, in the outer layer, that helps to create a barrier against contaminated sneezes and droplets, and with antimicrobial treatments for the middle layer that provides additional material protection for better hygiene and comfort. The inner layer is usually kept chemical-free to avoid skin irritation.



COMMON STANDARDS FOR MEDICAL FACE MASKS

ASTM 2100

Standard specification for performance of materials used in medical face masks

Test	Method	Level 1	Level 2	Level 3
		Low Barrier (80mmHg)	Moderate Barrier (120mmHg)	High Barrier (160mmHg)
Bacterial Filtration Efficiency	At 3 micron ASTM F2101	> 95%	> 98%	> 98%
Particulate Filtration Efficiency	At 0.1 micron ASTM F2299	> 95%	> 98%	> 98%
Delta P (Differential Pressure)	MIL-M-36954C, mm H ₂ O/cm ²	< 4.0	< 5.0	< 5.0
Fluid Resistance to Synthetic Blood	ASTM 1862, mmHg	80	120	160
Flame Spread	16 CFR part 1610	Class 1	Class 1	Class 1
Cytotoxic Test	ISO 10993-5	Not harmful	Not harmful	Not harmful
		na	na	na

EN ISO 14683

Medical face masks - Requirements and test methods

Test	Method	Type I	Type II	Type IIR
				(Splash resistance)
Bacterial Filtration Efficiency	EN 14683 Annex B	> 95%	> 98%	> 98%
		na	na	na
Breathability (Differential Pressure)	EN 14683 Annex C, Pa/cm ²	< 40	< 40	< 60
Splash resistance	ISO 22609, kPa	na	na	>16
		na	na	na
		na	na	na
Microbial cleanliness (Bioburden)	EN ISO 11737-1, cfu/g	< 30	< 30	< 30



COMMON STANDARDS FOR MEDICAL PROTECTIVE CLOTHING

In the area of medical protective clothing many different standards are in place.

It is very important to know which standard is required to avoid unnecessary cost and loss of time.

The most common standards and their classifications are shown below:

ISO 13795-1

Requirements and test methods – Surgical drapes and gowns

Category	Standard	Unit	Standard performance		High performance	
			Critical zone	Non critical zone	Critical zone	Non critical zone
Resistance to dry microbial penetration	ISO 22612	CFU	na	≤ 300	na	≤ 300
Resistance to wet bacterial penetration	ISO 22610	IB	≥ 2.8	na	6.0	na
Sterilization procedure	ISO 11737-1	CFU/100cm ²	≤ 300	≤ 300	≤ 300	≤ 300
Lint and other particles generation in the dry state	ISO 9073-10	Log 10	≤ 4	≤ 4	≤ 4	≤ 4
Resistance to penetration by water	ISO 811	cm	≥ 20	≥ 10	≥ 100	≥ 10
4 further fabric technology requirements	various	various	various	various	various	various

ISO 14126

Performance requirements and test methods for protective clothing against infective agents

Category	Standard	Unit	Requirement
Determination of the resistance of protective clothing materials to penetration by blood and body fluids	ISO/FDIS 16603 (using synthetic blood)	kPas	Level 1-6 (max. ≥ 20)
Determination of resistance of protective clothing materials to penetration by blood-borne pathogens	ISO/FDIS 16604 (using Phi-X174 bacteriophage)	min	Time at tested Level

AAMI – PB70

Liquid barrier performance and classification of protective apparel and drapes intended for use in health care facilities

Category	Standard	Requirement
Level 1	AATCC 42	≤ 4.5g
Level 2	AATCC 42	≤ 1.0g
	AATCC 127	≥ 20cm
Level 3	AATCC 42	≤ 1.0g
	AATCC 127	≥ 50cm
Level 4	ASTM F1670	no penetration 13.8 kPa
	ASTM F1671	no penetration 13.8 kPa

NFPA 1999

Standard on Protective Clothing and Ensembles for Emergency Medical Operations

Category	Chapter	Requirement
Bio fluid penetration	8.3	no penetration
Moisture vapour transmission	8.28	≥ 650 g/m ²
Water absorption resistance	8.31	≤ 30 %
Total heat loss	8.32	≥ 450 W/m ²
Flammability test	8.35	≥ 3.5 sec flame spread time
Evaporative resistance	8.42	≤ 30 Pa m ² /W

/ COMMUNITY MASKS

COVID-19 transmits from people to people due to water-based droplets transportation.

The virus can adhere to various surfaces, and can be carried by breath vapor and saliva droplets.

When our daily lives return to normal again, it is likely that masks will be part of our regular equipment. We will need to be protected with a comfortable and efficient face mask.

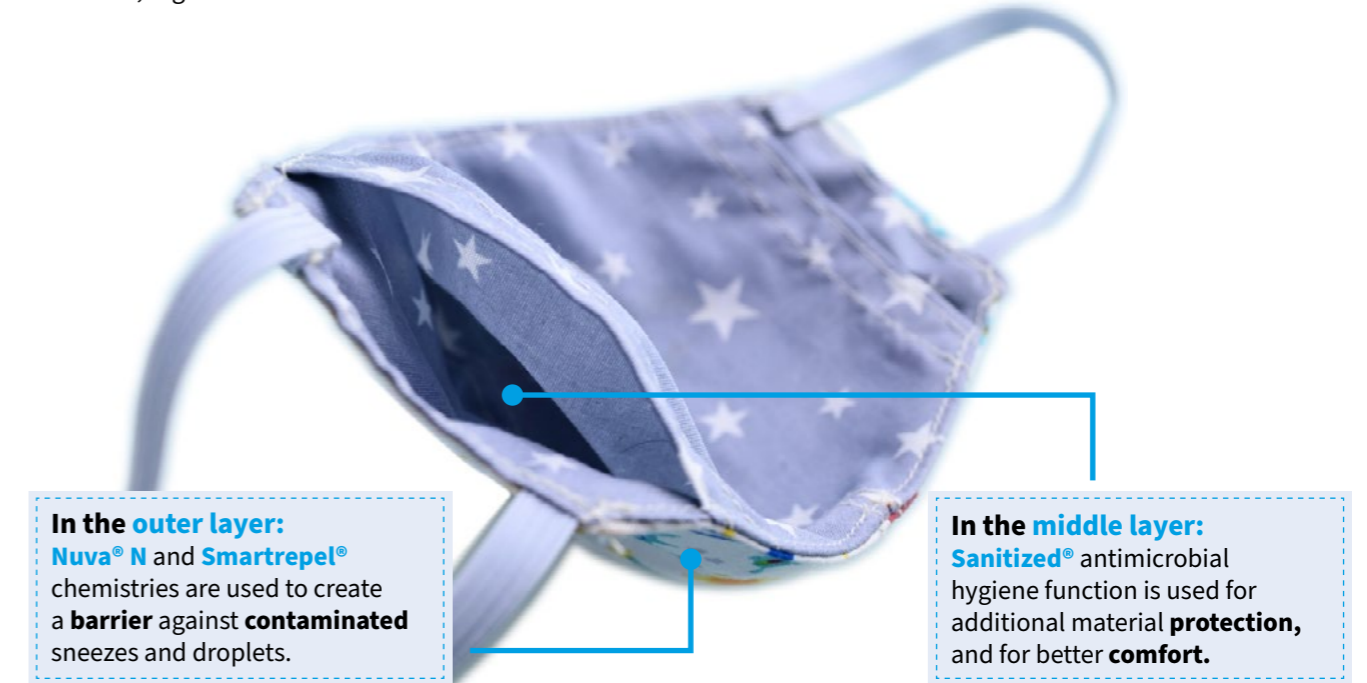
Archroma has the expertise and technology systems to make sure that your mask have you covered.

What's an enhanced fabric mask?

- Construction should offer minimum 2 to 3 layers;
- Each layer has a different function, fiber and finish;
- Each layer needs to be as breathable as possible;
- The chemicals must be particle-free to avoid particle inhalation whilst breathing;
- The chemical treatments need to offer some level of wash durability, as this is the major argument for textile masks.



Archroma's latest-generation **Nuva® N** provides an excellent level of protection, offering maximum surface energy reduction, together with **Sanitized®** antibacterial additives.



Care instruction

Hygiene cleaning

- Home wash up to 60°C for minimum 30 minutes;
- Do not use any softener or dryer sheets;
- Complete tumbler dry and iron with steam;
- Check that the mask is completely dried;

Explore more opportunities in other end markets for extra protection.



The responsibility for compliances with applicable regulations and all obligations arising from claims advertising and presentation of the article placed on the market are on the responsibility of the manufacture or importer. Ask Archroma & Sanitized representatives for any clarifications.

/ Check our latest updates at

www.hygieneprotection.archroma.com

...and discover more about our **SYSTEM SOLUTIONS** for hygiene protection

/ THE ARCHROMA WAY TO A SUSTAINABLE WORLD

Safe, efficient, enhanced.

As a global leader in color and specialty chemicals, we are committed to develop innovative systems and services to provide you with custom solutions that are:

Safe – It's our nature to protect. Safe to use, safe to release and safe to wear.

Efficient – It's our nature to rethink sustainable manufacturing. Innovating application processes that minimize resources and maximize productivity.

Enhanced – It's our nature to add another level of value. Effects, functionality and aesthetics to give additional value, for a life enhanced.



Ask your Archroma representative for additional information on our system solutions

*Below limits of detection according to industry standard test methods. Not intentionally added





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